ABSTRACT:

The accuracy of DNA computing highly depends on the DNA strands used in solving complex computations. As such, many approaches are proposed to design DNA oligonucleotides that are stable and unique. In this paper, an improved binary particle swarm optimization (IBPSO) algorithm is proposed and implemented. Four objective functions which are H-measure, similarity, hairpin and continuity are employed to define the uniqueness of designed sequences. The DNA words are constrained within a predefined range of GC-content and melting temperature. The performances and the ability of the algorithm to enhance the characteristics of generated DNA code words are analyzed. The results obtained show that this algorithm executes better sequences and did perform better compared to other optimization techniques. Moreover, it converges faster than the previously suggested binary particle swarm optimization algorithm.